Section II

PURPOSE AND BACKGROUND

1-2. PURPOSE.

a. Provide all participating organizations involved in the DSCS program with information concerning all aspects of the Digital Communication Satellite Subsystem (DCSS). To permit:

(1) Adequate planning.

(2) Prompt completion of assigned responsibilities.

b. Required actions and responsibilities are defined in:

(1) DCS Program Plan for the DCSS.

(2) Management Engineering Plan for DCSS.

(3) Transistion Implementation Plan.

c. The above documents will secure as source documentation for:

(1) DCSS update as dictated by technical design actions.

(2) Program changes resulting from DCA/JCS actions.

1-3. HISTORY OF SATELLITE COMMUNICATIONS.

a. The following milestones serve as a chronological sequence of events that produced the modern day version of satellite communications.

(1) In 1946 Satellite Communications were first demonstrated as a possibility when U.S. Army Signal Corps scientists at Fort Monmouth bounced radio signals off the moon in a project known as DIANA.

(2) In 1958 Project SCORE broadcasted a message from space via a rocket in a low-altitude orbit.

(3) In 1960, project COURIER, an Army developed satellite successfully operated as an experimental space messenger; and in October 1960, the Advent Agency was formed at Fort Monmouth.

(4) In 1962, the Advent Agency was renamed the U.S. Army Satellite Communications Agency (USASATCOMA).

(5) On 26 July 1963, NASA launched the world's first synchronous communications satellite, called SYNCDM, into orbit.

(a) The USASATCOMA provided all the ground and shipboard terminals for this historical and successful experiment.

(b) The first terminals were located at:

1. Fort Dix, N.J.

2. Camp Roberts, Ca.

3. Lakehurst NAS, N.J.

4. Aboard the USNS Kingsport.

(c) Working in close coordination with NASA, SATCOMA proceeded to conduct hundreds of tests over the satellite using:

1. Voice.

2. Facsimile.

3. Multichannel teletype.

4. Various other types of signals.

(d) It was during this time frame that the feasibility of satellite communications was demonstrated to:

1. U.S. Congress.

2. The State Department.

3. All elements of DOD.

4. The general public.

(e) Some of the most historic demonstrations of satellite communications were:

1. 23 August 1963 - President John F. Kennedy talking to the Prime Minister of Nigeria as the first presidential telephone call.

2. 31 October 1963 - United Nations, New York to Geneva.

3. 7 October 1964 - The opening of the Olympic Games in Japan was transmitted from Japan to the United States and relayed terrestrially and by cable to 21 countries.

(f) In December 1963, SATCOMA unveiled the first highly transportable terminal known as the MARK IV and deployed to Siagon after initial testing. Testing was performed by:

1. STRIKE command.

2. Army War College.

3. Fort Huachuca.

(6) In 1964, the AN/MSC-46 was added to the small but growing network of terminals conducting tests and passing traffic.

(a) The AN/MSC was operated by the Army.

(b) The AN/MSC was initially deployed to:

1. Hawaii.

2. Philippines.

3. Ethiopia.

(c) All terminals reverted to DCA control and MILDEP O & M.

(d) During the ensuing years, the AN/MSC-46 was deployed to 12 locations world-wide, including two terminals to Vietnam in November 1966.

(e) The AN/MSC-46, as originally deployed, boasted five voice channels and could transmit a limited wide-band capability.

(7) In 1965, SATCOMA began deploying the AN/TSC-54 light terminal housed in a S-280 shelter.

(a) The AN/TSC-54 made its appearance in 14 locations, including Thailand and Korea.

(b) The AN/TSC-54 was the first satellite terminal in Korea.

(c) The AN/TSC-54 was the last voice out of Siagon at the end of hostilities.

(8) In June 1966, the first satellites were launched for the Defense Satellite Communications Program.

(9) At the same time, DCA configured all networks world-wide to work with the new satellites.

(10) During the early 1970's, SATCOMA upgraded the AN/MSC-46 to 72 voice channels as well as adding a 12 voice channel capability to the AN/TSC-54.

(11) October 1975 began a new era with the deployment of the first heavy terminal with a 60 foot antenna at key locations:

(a) Hawaii.

(b) Sunnyvale.

(c) Fort Meade.

(d) Fort Detrick.

(e) Germany.

(f) Guam.

(g) Northwest.

(h) Croughton.

(i) Menwith Hill.

(j) Elmendorf.

(k) Kwajalein.

(l) New Boston.

(m) Offutt Air Force Base.

(12) In April of 1977, SATCOMA shipped the first Digital Communications Satellite Subsystem (DCSS) after many years of research which was conducted in parallel to deployments of analog equipments.

(a) It was then that new terminals replaced the old, and digital communications began to phase in.

(b) SATCOMA countermeasures equipment and wide-band high-rate trunking now became a reality with multiple up and down links at each location.

(13) In January of 1978, the AN/GSC-39 with its 40 foot antenna began being deployed.

(a) The AN/GSC-39 was accompanied by a new DCSS.

(b) The AN/GSC-39 deployment continued through 1985.

(14) In 1979, a first generation of production TACSAT terminals were developed and deployed.

(15) In May 1982, the AN/TSC-86 JCS Contingency Terminals were deployed complete with the all digital communications subsystem.

(16) In March 1985, the last analog circuits were replaced with digital circuits; and the Defense Satellite Communication System was now all digital.

(17) In December 1985, deployment of the newly developed State-of-the-Art (SAMT) terminal began and will continue until 1988.

(18) During 1986, SATCOMA began the deployment of several hundred AN/TSC-85A/93A/94A/100A terminals to world-wide commands.

b. USASATCOMA is continuing to develop satellite terminals and related communications equipment for DOD use.

c. USASATCOMA goals are:

(1) Reliability.

(2) Quality.

(3) Maintainability.

(4) Security from jamming.

d. Going back to project DIANA, the Army has been in the space program 40 years.

1-4. PROGRAM REQUIREMENTS.

a. The design and fabrication effort associated with the DCSS and presented in this document is based on the requirements and system configuration established by the following:

(1) DCA Program Plan for the DCSS.

(2) DCA Transition Implementation Plan.

b. In an effort to stabilize the design and fabrication and to permit deployment of the DCSS in line with current link activation schedules, the above requirements documents will form the basis for all DCSS design and fabrication.

c. Required upgrade of sites already delivered will be accomplished in accordance with:

(1) Priorities.

(2) Available funding.

1-5. CONFIGURATION CONTROL.

a. The configuration control of the DCSS is a USASATCOMA responsibility.

(1) Production of field modifications will be accomplished by the Army on a scheduled basis.

(2) Some minor modifications will be supplied to the user in kit form if it is determined that the following are available on site to permit site level installation.

(a) Necessary tools.

(b) Adequate personnel skill level.

b. The DCSS is a fully documented and supportable subsystem; therefore, any unauthorized modifications by the user may jeopardize the performance or supportability of the subsystem.

c. Configuration control of the facility itself is the responsibility of the assigned O & M organization.

(1) The specific element assigned is usually the engineering element supporting that headquarters.

(2) All personnel having an interest in placing technical equipment on-site should coordinate with their respective HQ engineering element.

(3) The HQ engineering element should coordinate with USASATCOMA to preclude the costly relocation of technical equipment.